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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MILORD, MARCEAU	
ART UNIT	**PAPER NUMBER**
2618	

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/603,372	KNOBEL ET AL.
	Examiner	Art Unit
	Marceau Milord	2618

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28 and 54-80* is/are rejected.

7)☒ Claim(s) *29-53* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1- 28, 54-80, are rejected under 35 U.S.C. 103(a) as being unpatentable over Fullerton et al (US Patent No 6763057 B1) in view of Larrick, Jr et al (US Patent No 6690741 B1).

Regarding claims 1, 7-11, Fullerton et al discloses a method for transmitting information (figs. 22-23), the method comprising: allocating, for signal transmission, each of a plurality of frequency sub-bands of an ultra-wide band spectrum (col. 6, lines 52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); and sending an ultra-wide band transmission comprising the information over the ultra-wide band spectrum (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the steps of sending a signal over each of the plurality of sub-bands; wherein sending the signals comprises sending a different waveform over each sub-band; wherein each of the different waveforms is used to represent

different information; wherein sending the signals comprises sending more than one waveform over a single sub-band at a given time.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. Phase-locking the low-level impulse generator to the oscillator can generate a pulse-to-pulse coherent waveform. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Regarding claim 2, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) comprising wirelessly sending the ultra-wide band transmission (col. 6, lines 52-65).

Regarding claim 3, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein sending the signals comprises sending pulsed signals (col. 7, lines 4-24).

Regarding claim 4, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein sending the signals comprises sending burst symbol cycle transmissions (col. 11, lines 6-31).

Regarding claim 5, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein each burst comprises sequenced bits of information (col. 12, lines 5-27).

Regarding claim 6, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein each burst comprises symbols, and wherein each symbol comprises a sequence that maps to one or more bits of information (col. 13, lines 4-44).

Regarding claim 12, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein sending the ultra-wide band signal comprises switching between different sub-bands (col. 16, lines 5-32).

Regarding claim 13, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein the switching is performed after each symbol is transmitted (col. 16, lines 11-40).

Regarding claim 14, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein the switching is performed after several symbols are transmitted (col. 16, lines 24-40).

Regarding claim 15, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) wherein the switching is performed after one or more symbols are transmitted and an OFF period (col. 16, lines 23-40).

Regarding claim 16, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) comprising allocating one or more of the sub-bands based on information to be transmitted (col. 18, lines 30-47).

Regarding claim 17, Fullerton et al as modified discloses a method for transmitting information (figs. 22-23) comprising allocating one or more of the sub-bands based on a pseudo-random sequence (col. 8, lines 20-41).

Regarding claims 18-22, Fullerton et al discloses a method for receiving information, (figs. 22-23), the method comprising: allocating, for signal reception, each of a plurality of frequency sub-bands of an ultra-wide band spectrum (col. 6, lines52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); and receiving an ultra-wide band transmission comprising the information over the ultra-wide band spectrum (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the steps of receiving a signal over each of the plurality of sub-bands; wherein receiving the signals comprises receiving the ultra-wide band transmission and tracking the signal timing using the relation between the sub-bands phases and the signal timing; wherein tracking the timing comprises tracking the sub-bands phases using a single radio chain.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB

signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. Phase-locking the low-level impulse generator to the oscillator can generate a pulse-to-pulse coherent waveform. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques

Regarding claims 23-28, Fullerton et al discloses a method for communicating information (figs. 22-23), the method comprising: allocating, for signal transmission, each of a plurality of frequency sub-bands of an ultra-wide band spectrum (col. 6, lines52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); sending an ultra-wide band transmission comprising the information over the ultra-wide band spectrum; and receiving the ultra-wide band transmission comprising the information over the ultra-wide band spectrum, comprising receiving the signals (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the steps of sending a signal over each of the plurality of sub-bands; wherein allocating the sub-bands comprising allocating sub-bands that at least partially overlap.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. Phase-locking the low-level impulse generator to the oscillator can generate a pulse-to-pulse coherent waveform. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Regarding claims 54-55, Fullerton et al discloses a system for communicating information (figs. 22-23), the system comprising: allocating, for signal transmission, each of a plurality of frequency sub-bands of an ultra-wide band spectrum; a transmitter for sending an

ultra-wide band transmission comprising the information over the ultra-wide band spectrum (col. 6, lines 52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); and a receiver for receiving the ultra-wide band transmission comprising the information over the ultra-wide band spectrum, comprising receiving the signals (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the steps of sending a signal over each of the plurality of sub-bands; wherein sending the signals comprises sending burst symbol cycle transmissions.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. Phase-locking the low-level impulse generator to the oscillator can generate a pulse-to-pulse coherent waveform. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to

produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Regarding claim 56, Fullerton et al discloses a method for communicating information (figs. 22-23), comprising: converting a first data signal containing information into an encoded signal using an Inverse Fast Fourier Transform (col. 6, lines 52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); converting the encoded signal into an encoded ultra-wide band signal comprising burst symbol cycles (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the steps of decoding the encoded ultra-wide band signal using a Fast Fourier Transform to obtain the information.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. Phase-locking the low-level impulse generator to the oscillator can generate a pulse-to-pulse coherent waveform. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention

was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Regarding claim 57, Fullerton et al discloses a method for communicating information (figs. 22-23), comprising: converting a first data signal containing information into an encoded signal using an Inverse Fast Fourier Transform (col. 6, lines52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20); converting the encoded signal into an encoded pulsed ultra-wide band signal (col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the step of decoding the encoded pulsed ultra-wide band signal using a Fast Fourier Transform to obtain the information.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. A pulse-to-pulse coherent waveform can be generated by phase-locking the low-level impulse generator to the oscillator. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques

Regarding claims 58-68, Fullerton et al discloses a method for transmitting information (figs. 22-23), the method comprising: after modulation of a narrowband signal, translating the narrowband signal containing the information into a second signal containing the information, (col. 6, lines52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20; col. 7, lines 2-31; col. 13, lines 35-54).

However, Fullerton et al does not specifically disclose the features of a second signal being a wider band signal than the narrowband signal, and the narrowband signal and the second signal comprising the same modulated waveform.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. A pulse-to-pulse coherent waveform can be generated by phase-locking the low-level impulse generator to the oscillator. The combination of phase,

frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Regarding claims 69-80, Fullerton et al discloses a method for transmitting information (figs. 22-23), the method comprising: transmitting, for a first period of time of each of a series of cycles (col. 6, lines 52-65; col. 16, lines 5-18; col. 12, line 59- col. 13, line 20).

However, Fullerton et al does not specifically disclose the steps of transmitting bits of information at a faster rate than a rate at which the one or more bits information would be transmitted if the one or more bits of information were transmitted using the narrowband signal; translating a narrowband signal into a second signal, and wherein translating the narrowband signal into the second signal comprises translating the narrowband signal into an ultra-wide band signal.

On the other hand, Larrick, Jr et al, from the same field of endeavor, discloses a data-modulated ultra wideband transmitter that modulates the phase, frequency, bandwidth, amplitude and/or attenuation of ultra-wideband pulses. The transmitter confines or band-limits UWB signals within spectral limits for use in communication (col. 3, lines 7-23; col. 3, lines 60-67). Furthermore, the center frequency, as well as the instantaneous phase, of the UWB signal can be controlled via oscillator control. This allows for frequency agile UWB emissions by simply changing the frequency of the oscillator according to a desired hopping pattern. In addition, the

instantaneous phase of the UWB pulse can be changed on a pulse-by-pulse basis to allow for various forms of phase modulation. A pulse-to-pulse coherent waveform can be generated by phase-locking the low-level impulse generator to the oscillator. The combination of phase, frequency and amplitude modulations enable the generation of a wide class of UWB waveforms including UWB quadrature amplitude modulation (col. 6, lines 10-60; col. 7, lines 12-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Larrick to the communication system of Fullerton in order to produce Ultra-wideband transmissions at well-controlled center frequencies and bandwidths extending to higher operating frequencies, and to allow for more efficient modulation techniques.

Allowable Subject Matter

3. Claims 29-53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marceau Milord whose telephone number is 571-272-7853. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew D. Anderson can be reached on 571-272-4177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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